Melonie Anderson

From: Evan Maxim
Sent: Tuesday, May 7, 2013 1:34 PM
To: Kamuron Gurol; Susan Cezar
Cc: Melonie Anderson; Debbie Beadle; Kathy Curry
Subject: FW: ECA review- lake sediments and phosphorus
Attachments: Lake sediment discussion.pdf

Public Comment

Evan Maxim
Senior Planner
City of Sammamish
425.295.0523

Effective March 1st, my email address is: emaxim@sammamish.us. Emails sent to my old email address are being forwarded temporarily, however please update your email address for me accordingly.

From: Greg Krabbe [mailto:gkrabbe@comcast.net]
Sent: Tuesday, May 07, 2013 11:48 AM
To: Tom Odell
Cc: Ramiro Valderrama-Aramayo; John Curley; Don Gerend; John James; Nancy Whitten; Tom Vance; Kamuron Gurol; larrymartin@dwt.com; "Brent Carson"; Evan Maxim; jetosti@msn.com; Debbie Beadle
Subject: ECA review- lake sediments and phosphorus

Mayor Odell,

At the last Council work session for the CAO review you voiced concern about disturbance of lakebed sediments within Lake Sammamish due to tight-lined discharges into the lake. Discharge from smooth walled pipes does carry considerably more velocity / energy than discharge from naturally occurring overland and stream flow. For this reason, a variety of energy dissipation techniques are used to reduce flow energies. These techniques are well established and dissipation efficiencies as high as 80% are possible.

When tightline discharges are designed and sited correctly, there is very little chance of suspending lake sediments or adding phosphorus from these sediments to the lake water for both physical and chemical reasons. These are explained in the letter from Limnologist Rob Zisette with Herrera environmental attached.

I trust this is helpful.

Greg Krabbe, PE
GFK Consulting Inc
425 347 2898

EXHIBIT NO. CC 49

HERRERA

May 3, 2013

Mr. Greg Krabbe
KKBL Ventures 575 LTD
335 Park Place Center, Suite G111
Kirkland, WA 98033

Subject: Phosphorus loading from sediment suspension at stormwater outfall

Dear Greg:

At your request, I prepared this letter to briefly summarize issues regarding increased total phosphorus loadings to Lake Sammamish from disturbance of lake sediment by stormwater outfall discharge.

Discharge of stormwater from a submerged stormwater outfall would not suspend lake sediment if the outfall is properly designed and located above the lake bottom. Outfall design would include analysis of water velocity under periods of high flow in comparison to the distance from the outfall to sediments, vertical angle of the outfall alignment in relation to sediment slope, and the size of sediment particles. Energy dissipation and/or sediment protection measures are commonly incorporated into the outfall design to further prevent sediment suspension. Sediment suspension from outfall discharge is generally not allowed by Hydraulic Project Approval (HPA) permits.

Discharge of stormwater from an upland stormwater outfall located near the shoreline would not suspend lake sediment if the outfall is properly designed to include erosion protection in the shoreline area. If nearshore sediments were suspended during high flow conditions, they would settle fairly rapidly because they are located in a high energy environment that has previously been exposed to wave action.

Suspension of lake sediments may introduce minor amounts of dissolved phosphate ions contained within those sediments. The interstitial dissolved phosphorus content is relatively low in nearshore sediments because they contain oxygen that forms particulate phosphorus-iron complexes. Thus, temporary suspension of nearshore sediments does not substantially increase dissolved phosphorus concentrations in the lake for algae growth.

Herrera would be pleased to provide assistance with outfall design to minimize sediment phosphorus suspension or shoreline erosion. We can also assist with permitting and evaluation of outfall locations to address habitat impact issues. For Rowley Properties, we evaluated environmental impacts of three stormwater outfall alternatives in 2011 for a 78-

acre redevelopment project at Hyla Crossing and Rowley Center located in Issaquah, Washington. For this project, we recommended discharge from a submerged outfall located at a depth of approximately 15 feet. This depth was selected to protect salmonids utilizing shallow aquatic plant habitat in this area of the lake. We also determined that phosphorus loading and water quality impacts to the lake would not vary for the outfall alternatives because they were all located in the epilimnion (surface layer) and above the thermocline depth of 30 to 35 feet.

Sincerely,

Herrera Environmental Consultants, Inc.

Rob Zisette
Water Quality Principal